NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

INCINERATOR

(Each)
CODE 769

DEFINITION

An incinerator is a closed chamber device that uses combustible fuel to cremate mortalities from poultry, swine, or other types of small animal operations.

PURPOSE

The purpose of this practice is to provide a suitable disposal method of animal mortalities to prevent pollution, control disease, and improve environmental quality.

CONDITIONS WHERE PRACTICE APPLIES

This standard covers the planning, sizing, and installation of a manufactured incinerator for the disposal of animal mortalities.

This practice applies where current disposal practices of animal mortalities are unsatisfactory and where there is a need to improve sanitation, reduce pollution, or enhance the visual resource.

CRITERIA

All federal, state, and local laws, rules and regulations governing solid waste management, pollution abatement, and health and safety shall be strictly adhered to. The owner or operator shall be responsible for securing all required permits, approvals, and registration for the operation of the unit in accordance with appropriate laws, rules, and regulations.

Disposal of dead animals is regulated by the Missouri Department of Agriculture (MDA) with technical guidance provided by University Outreach and Extension (UOE) in cooperation with the Missouri Department of Natural Resources (MDNR) as per section 269.020, Revised Statutes of Missouri.

Livestock production growers that are a Concentrated Animal Feeding Operation (CAFO) must submit to MDNR one or more acceptable methods of dead animal disposal, along with the application for a permit or a Letter of Approval (LOA). All other confined livestock facilities are recommended to submit one or more acceptable dead animal disposal methods submitting a request for a permit or LOA.

Agricultural incinerators do not require a MDNR construction or operating permit when designed, constructed, and operated in an efficient manner as recommended by UOE for the purpose of incinerating dead animals. The incinerator will have a burn capacity of less than one hundred (100) pounds per hour of Type IV waste as defined by Incinerator Standards of the *Incinerator Institute of America*. This incinerator exemption only allows incineration of dead animals from this farm or ranch enterprise. Incineration of any other waste materials such as plastics or other wastes that contain chlorine generated from this operation disqualifies the incinerator from the previous exemption.

Other provisions of the MDA dead animal law provide regulated guidelines for the manner in which dead animals are managed, collected, transported, and the holding of dead animals. Holding time for dead animals will not exceed 48 hours. The livestock production manager will detail these provisions in the overall unit operational plan.

Sanitation is deemed necessary and requires thorough cleaning and disinfecting the interior and exterior of transport equipment and holding containers.

UOE design recommendations in agreement with MDA and MDNR require incinerators to have two chambers. Dual chamber incinerators installed for dead animal disposal must be on an incinerator list maintained by UOE in cooperation with MDNR. Owners or operators should contact MDA, MDNR and/or UOE prior to construction and operation to

select an incinerator from the list that meets the producer needs before making financial commitments. Any incinerator not on the referenced list will be stack tested and will meet MDNR or other regulatory agency for air quality and health standards before being accepted.

Design

Incinerators previously referenced on the UOE incinerator list will be used for disposal of dead animals. The required minimum incinerator capacity will be determined using the table or formula methods below.

METHODS TO CALCULATE CAPACITY

TYPE ANIMAL	DAILY LOSS FACTOR (Lbs/day/animal)
Chickens:	
Broiler (4.2 lbs)	0.0050
Laying Hens (4.5 lbs)	0.0014
Breeding Hens (7.5 lbs)	0.0019
Breeder, Male (11 lbs)	0.0082
Turkey:	
Hen (14 lbs)	0.0081
Tom, Light (24 lbs)	0.0193
Tom, Feather (30 lbs) Production	0.0286
Swine:	
Suckling Pigs (5 lbs)	0.04 (per sow)

If detailed records are available, the following formula can be used to determine the Daily Loss Factor for a specific operation:

$$\frac{MW \times AM}{L} = \text{Daily Loss Factor}$$

Where:

MW = Mature weight of the animal (i.e. - 4.2 lbs)
AM = Average mortality for the life of the animals, as a decimal (i.e. - 0.05)
L = Life of the animals in days (i.e. - 42 days)

Example 1 (Using Formula):

Given: 36,000 roasters/broilers
6.5 lbs market weight
8% average mortality
65 day flock life

Daily Loss Factor = $\frac{6.5 \times 0.08}{65}$ = 0.008 lbs/day/bird

Average daily weight of dead birds:
36,000 x 0.008 = 288 lbs/day

Incinerator capacity:
Minimum 288 lbs per loading capacity

Example 2 (Using Table Value):

Size of swine unit: 500 sows (total on farm)

Average daily weight of dead suckling pigs:
500 x 0.04 = 20 lbs/day

Incinerator capacity:
Minimum 20 lbs per loading capacity

The recommended incinerator size will be the smallest size available that will handle the required minimum capacity. More than one incinerator may be required for large facilities. Heavy mortalities may require loading the incinerator more than once a day.

The grower may select the incinerator of choice from the previously referenced list maintained by UOE in cooperation with MDNR.

Any operation using incineration for disposal of dead animals will have a plan for collecting, holding and disposing of the ash material remaining after incineration. This plan will be contained in the Nutrient Management Plan established for the operation. Prior to land application of incinerated ash, an annual analysis will be taken to determine the nutrient content for completion of the nutrient plan. Only double chamber incinerators with a burner in each chamber are approved for use. The secondary chamber to safely maintain proper operating temperature will require a temperature controller.

Electrical hook-up shall be installed as per standard industry practices but in no case less than the minimum requirements of the most recent edition of the National Electrical Code. Wherever installation could be classified as a hazardous location, specific conformance to Article 500 of the National Electrical Code will be met.

Gas hook-up must be installed and certified in writing by a qualified state licensed installer using National Fire Protection Association (NFPA) Codes 54 and 58; all other state, national, and local codes, and in accordance with the manufacturer's recommendations. Other fuel sources must meet all state and local codes for transmission of flammable or

volatile fuels. For these alternative fuel source incinerators, a Spill Prevention, Control, and Counter Measures (SPCC) Plan shall be prepared by a registered professional engineer for any individual fuel storage tank in excess of 660 gallons, or cumulative storage capacity of multiple tanks in excess of 1,320 gallons.

Location

Locate the incinerator according to the following requirements:

- at least 50 feet from any surface water course
- at least 100 feet from any well or subsurface water source
- locate down slope from springs and wells
- at least 20 feet from any building to prevent spontaneous or accidental combustion
- at least 1,500 feet from any non-owned, inhabited residence
- on a concrete slab
- place fuel storage (liquids) structure within a secondary containment facility

CONSIDERATIONS

Incinerators are sized for normal mortalities and are not intended for disposal of large-scale death losses of animal mortalities that result from a catastrophic event such as natural disasters, disease outbreaks or a disease eradication and control program. MDA in consultation with MDNR and UOE will develop an emergency plan for proper management of large-scale death losses that fall outside the scope of disposal methods outlined in state regulations.

Consider the initial cost of building an incinerator and continued cost of operation and maintenance of the incinerator.

Consideration should be given to providing roof protection for the incinerator to extend the life of the unit. Metal roof purlins and covering should be used to prevent spontaneous or accidental combustion from the stack.

Safety precautions will be considered in the placement and operation of the incinerator such as distance to combustible materials, traffic around unit, and accidental contact with the heated incinerator during and after incineration, cooling down period. This may include fencing and/or placement of warning signs. Producer is encouraged to determine what provisions are needed for worker and facility safety.

Consideration should be given to fuel cost of operating the incinerator.

Consideration will be given to fluctuating mortality losses during short periods that exceed incinerator capacity. Prepare a backup handling system to dispose of excess mortalities in an environmentally safe manner.

Compare the economic and environmental benefits of alternative dead animal disposal methods over incineration.

Consider the potential pollution impacts if the incinerator is not properly operated and maintained.

OPERATIONS AND MAINTENANCE

Incinerators shall be operated in a manner as is necessary to prevent the emission of objectionable odors and particulate fallout.

Catch and dispose of liquids such as melted fat, body fluids or fuel drips that may drain or escape during the burning event. These materials will be recycled during subsequent burning events or otherwise disposed in an appropriate manner.

Plan will include provisions for storage of ash until it can be land applied or disposed at an approved land fill operation.

Land application of ash will be applied at similar intervals to the application timing of other organic by-products produced with the operation.

Follow manufacturer's guidance for periodic inspections and maintenance of the specific incinerator.

Incinerator ash will be removed after each burn event to maintain efficiency of incineration. Bones and other materials that remain after a burn event will be placed towards the burner end to be consumed during the next burn event. Excess ash left in incinerator increases energy consumption and longer cool-down periods.

Maintain records a minimum of 5 years of all maintenance checks and work performed to incinerator and supporting equipment.

Maintain appropriate utilization records in accordance with the comprehensive nutrient management plan.

Maintain appropriate disposal records of incinerated ash when land-filled at an approved site.

REFERENCES

UOE Design and Operational Guidelines
National Electric Code
National Fire Protection Association Code
EQ-216 "Dead Animal Disposal Laws in Missouri", UOE (old WQ series)